

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 10, and 17 are currently being amended. After amending the claims as set forth above, claims 1-4, 6-20, 22, and 23 are now pending in this application.

The claim amendments are presented after a final rejection. However, Applicants respectfully submit that these claim amendments only require a cursory review by the Examiner because the claim amendments use language referred to specifically in the Examiner's Response to Amendments. See M.P.E.P. 714.13. Accordingly, Applicants respectfully request entry of the amendments.

Examiner's Response to Arguments

In the Office Action, the Examiner provided the following comments:

Applicant's arguments with respect to claims have been considered by are considered to be non-persuasive. The commentary regarding the non-presence of a barrier layer at the sides and bottom of the via is incorrect (pp. 6-7, Response). The via structure (10) (Figure 1) (Col. 4, lines 32-35) is present atop the M1 layer. Layer 46 is not a part of layer M1, and as such, is at the bottom of the via. Along the sides of the via, layer 40 is present. It is not germane that the thickness of the shoulder portion is small. **There is no recitation in the claim limitations which states that the barrier layer "extends" along the lateral sidewalls and bottom of the via aperture.** Further, regarding Claim 10, the reference shows a "conformal" (adhering to the shape or size of) layer "at" ("presence in or on") the bottom sides of a via aperture. Edelstein and Bogel et al. are combined with Joshi et al. to obtain copper alloy for the via. The remaining arguments relating to the patentability of dependent claims based on the patentability of independent claims is incorrect, based on the above.

(pp. 9-10, underlining added.)

Applicants respectfully disagree with the Examiner. The Examiner argues that the claims do not recite that “the barrier layer ‘extends’ along the lateral sidewalls and bottom of the via aperture” However, Claim 1 specifically stated: “forming a barrier layer **along** lateral side walls and a bottom of a via aperture” (emphasis added). According to the American Heritage Dictionary, Third Edition, “along” is understood to mean “over the length of; continuously beside.” Applicants believe that “along” used in the context of the claim is the same as “extending along.” Nevertheless, to advance prosecution, Applicants have hereby amended Claim 1 to recite “extending along” to make clear the Applicants claimed invention recited in Claim 1 forms a barrier layer extending along lateral side walls and a bottom of a via aperture.

The Examiner argues that the language “conformal layer section at” of Claim 10 means a presence in or on. The SEMATECH Dictionary of Semiconductor Terms available at www.sematech.org indicates that “conformal” refers to being “similar in form and character.” A conformal layer at the bottom and sides of the aperture should be understood to extend over the bottom and sides. Nevertheless, to advance prosecution, Applicants have amended claim 10 to recite “providing a conformal layer section **extending along** a bottom and sides of a via aperture.” Applicants have also amended Claim 17 to recite: “providing a barrier material **extending along** a bottom and sides of the aperture to form a barrier layer.”

Applicants believe these amendments should overcome the outstanding rejections, based on the Examiner’s comments in the Office Action.

Rejections Under 35 U.S.C. § 103

Claims 1-3, 6-8, 10, 13, 15 and 16-20

In Section 2 of the Office Action, Claims 1-3, 6-8, 10, 13, 15 and 16-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,030,895 (Joshi et al.) in view of U.S. Patent No. 6,399,496 (Edelstein et al.) and U.S. Patent No. 6,749,699 (Bogel et al.) Applicant respectfully traverses the rejection.

Taken as a combination, Joshi, Edelstein and Bogel et al. do not disclose or suggest a “barrier” or “conformal” layer extending along the sides and bottom of the via, as required by the claims as amended. For at least this reason, Applicants respectfully request withdrawal of the rejection of Claims 1-3, 6-8, 10, 13, 15, and 16-20.

Claim 4

In Section 12 of the Office Action, Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Joshi et al. in view of Edelstein et al. and Bogel et al., and further in view of U.S. Patent No. 6,440,849 (Merchant et al.). Applicants respectfully traverse this rejection.

Claim 4 depends from Claim 1 and, thus, requires all of the elements of Claim 1. Merchant alone or in combination with Joshi, Edelstein and Bogel et al. fails to disclose or suggest “forming a barrier layer extending along lateral side walls and a bottom of a via aperture” recited by amended Claim 1. As such, the rejection cannot be properly maintained. Applicants respectfully request withdrawal of the rejection.

Claim 9

In Section 13 of the Office Action, Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Joshi et al. in view of Edelstein et al. and Bogel et al., and further in view of U.S. Patent No. 6,380,083 (Gross). Applicants respectfully traverse this rejection.

Claim 9 depends from Claim 1 and, thus, requires all of the elements of Claim 1. Gross alone or in combination with Joshi, Edelstein and Bogel et al. fails to disclose or suggest “forming a barrier layer extending along lateral side walls and a bottom of a via aperture” recited by amended Claim 1. As such, the rejection cannot be properly maintained. Applicants respectfully request withdrawal of the rejection.

Claims 11 and 12

In Section 14 of the Office Action, Claims 11 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Joshi et al. in view of Edelstein et al. and Bogel et al., and further in view of U.S. Patent No. 6,090,710 (Andricacos et al.) Applicants respectfully traverse this rejection.

Claims 11-12 depend from Claim 10 and, thus, require all of the elements of Claim 10. Andricacos alone or in combination with Joshi, Edelstein and Bogel et al. fails to disclose or suggest “providing a conformal layer section extending along a bottom and sides of a via aperture positioned over the first conductive layer to form a barrier separating the via aperture from the first conductive layer” recited by amended Claim 10. As such, the rejection cannot be properly maintained. Applicants respectfully request withdrawal of the rejection.

Claims 21 and 22

In Section 17 of the Office Action, Claims 21 and 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Joshi et al. in view of Edelstein et al. and Bogel et al., and further in view of Merchant et al. Applicants respectfully traverse this rejection.

Claim 21 was previously cancelled. Claim 22 depends from Claim 17 and, thus, includes all of the elements of Claim 17. Merchant alone or in combination with Joshi, Edelstein and Bogel et al. fails to disclose or suggest “providing a barrier material extending along a bottom and sides of the aperture to form a barrier layer.” As such, the rejection cannot be properly maintained. Applicants respectfully request withdrawal of the rejection.

Claim 23

In Section 19 of the Office Action, Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Joshi et al. in view of Edelstein et al. and Bogel et al., and further in view of Gross. Applicants respectfully traverse this rejection.

Claim 23 depends from Claim 17 and, thus, requires all of the elements of Claim 17. As indicated above, Gross alone or in combination with Joshi, Edelstein and Bogel et al. fails to disclose or suggest "providing a barrier material extending along a bottom and sides of the aperture to form a barrier layer" recited by Claim 17. As such, the rejection cannot be properly maintained. Applicants respectfully request withdrawal of the rejection.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

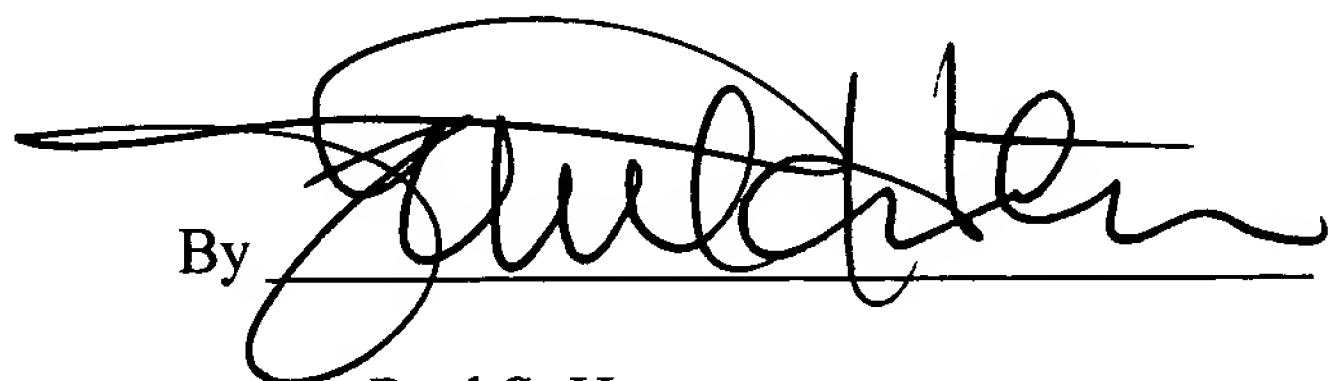
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-2350. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-2350. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-2350.

Respectfully submitted,

Date March 7, 2005

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By

A handwritten signature in black ink, appearing to read "Paul S. Hunter", written over a horizontal line.

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